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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* YUNG-SEOP LEE

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Appeal 2009-007352  
Application 09/782,149  
Technology Center 3600

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Decided: February 25, 2010

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Before KENNETH W. HAIRSTON, TERRY J. OWENS, and  
HUBERT C. LORIN, *Administrative Patent Judges*.

LORIN, *Administrative Patent Judge*.

DECISION ON APPEAL

## STATEMENT OF THE CASE

Yung-Seop Lee (Appellant) seeks our review under 35 U.S.C. § 134 (2002) of the final rejection of claims 1-7 and 10-16. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

## SUMMARY OF DECISION

We AFFIRM-IN-PART.

## THE INVENTION

The invention “relates generally to a computer implemented method and apparatus for evaluating records indicative of contributions of a customer to a business, such as an airline.”  
Specification 1:4-6.

Claim 1, reproduced below, is illustrative of the subject matter on appeal.

1. A computer implemented method of evaluating a plurality of customer records stored in a computer database to identify high value customers to be targeted by a customer retention or reward program, each customer record having at least a first attribute and a second attribute, each of the first attribute and the second attribute having an associated attribute value, the method comprising:

a) first sorting the plurality of customer records based on the first attribute and assigning a first discretized attribute to each customer record where the first discretized attribute is based on the sorted rank of the customer record;

b) second sorting the plurality of customer records based on the second attribute and assigning a second

discretized attribute to each customer record where the second discretized attribute is based on the sorted rank of the customer record;

c) third sorting the plurality of customer records in to an order based on the assigned first discretized attribute scores associated with the first attribute;

d) fourth sorting the ordered plurality of customer records resulting from the third sorting in to an order where the customer records having the same first discretized attribute scores are further sorted based on the assigned second discretized attribute scores associated with the second attribute;

e) fifth sorting the ordered plurality of customer records resulting from the fourth sorting in to an order based on the attribute values associated with at least the first attribute and the second attribute, until customer records, which have different attribute values associated with at least the first attribute or the second attribute, have been sorted to different ranks;

f) assigning an evaluation score to each customer record based on the rank of each customer record after the fifth sorting and independent of the discretized attribute scores; and

g) identifying the high value customers by selecting the customer records that have the highest assigned evaluation scores.

## THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Jones III

US 6,925,441 B1

Aug. 2, 2005

Hughes, Arthur Middleton, *Quick Profits with RFM Analysis*, <http://web.archive.org/web/19990208211536/www.dbmarketing.com/articles/rfmtree.html>, Database Marketing Institute, archived Feb. 8, 1999. (Hughes)

*RFM for Windows*, Database Marketing Institute Software,  
<http://www.dbmarketing.com/ams.html>, Database Marketing  
Institute, archived Feb. 3, 1999. (RFM)

The following rejections are before us for review:

1. Claims 1-7, 10, and 14-16 are rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter.
2. Claims 1-7, 10, and 14-16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hughes and Jones III.
3. Claims 11-13 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hughes, Jones III, and RFM.

## ISSUES

The first issue is whether the Examiner has shown the processes claimed in claims 1-7, 10, and 14-16 fail to pass the *Bilski* machine-or-transformation test determining patent-eligibility of processes under 35 U.S.C. §101.

The second issue is whether the record supports the Examiner's finding that Hughes discloses the step of

fifth sorting the ordered plurality of customer records resulting from the fourth sorting in to an order based on the attribute values associated with at least the first attribute and the second attribute, until customer records, which have different attribute values associated with at least the first attribute or the second attribute, have been sorted to different ranks  
(claim 1) and, as a consequence, whether the rejections of claims 1-7, 10, and 14-16 under 35 U.S.C. §103(a) as being unpatentable over

Hughes and Jones III and claims 11-13 under 35 U.S.C. §103(a) as being unpatentable over Hughes, Jones III, and RFM are tenable.

### FINDINGS OF FACT

We find that the following enumerated findings of fact (FF) are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

#### *Claim construction*

1. The first step of the method of claim 1 calls for a sorting of customer records based on a “first attribute” and assigning “a first discretized attribute” to each record, “where the first discretized attribute is based on the sorted rank of the customer record.”
2. The Specification does not appear to provide express definitions for “attribute” or “discretized attribute.”
3. But the Specification (Pp. 6-7) provides an example of data for each customer record with respect to the airline industry (Table 10) where the “attributes listed in the header row of Table 1” (p. 7) are labels descriptive of the type of information contained in each record.
4. Two attributes the Specification discusses are “Net Revenue (CV) and No. of Flights (FV)” (p. 8).

5. Accordingly, “attributes” mean labels describing certain information contained by the data gathered in each record of a computerized database.
6. The data that is gathered can be in any form “includ[ing], but are not limited to, number, currency, data, time, text, sound, and image” (p. 7).
7. The Specification appears to define “discretized attribute” as a score applied to the records for a particular attribute. In the following example, the data is sorted either by the CV or FV and given a score:

In the preferred embodiment, the records/customers are sorted, in step 30, in ascending order of CV or FV values. Next, in step 32, the sorted CV or FV values are split into quartiles, with break points of 25%, 50% and 75%. ... In particular, CV or FV of the lowest value up to 25% are grouped into quartile 1, CV or FV of values between 25%-50% are grouped into quartile 2, CV or FV values between 50%-75% are grouped into quartile 3, and CV or FV values of 75% and up are grouped into quartile 4. Each quartile is then assigned a corresponding score of from 1 to 4, in step 34. In particular, all the CV or FV which belongs to quartile 1 will have the same attribute score of 1, all the CV or FV which belongs to quartile 2 will have the same attribute score of 2, and so one.

Specification: Pp. 8-9.

8. The second step of the method of claim 1 calls for the customer records to be sorted based on a “second attribute” and “a second discretized attribute” is assigned to each record.

The attribute scores [for the CV attribute] are stored in Table 1 as Net Contribution Score (CS). Similarly, the attribute scores which correspond to FV values are stored

in Table 1 as Gross Frequency Score (FS). The CS and FS scores constitute a pair in the form of (CS,FS) . . . .  
Specification: p. 9, ll. 15-18.

9. The third step of the method of claim 1 calls for the records to be sorted for a third time “to an order based on the assigned first discretized attribute scores associated with the first attribute.” In the example of Table 1 of the Specification, where CV is the first attribute, the third claim step would sort the records according to CS.
10. According to the fourth step of the method of claim 1, the result of the third sorting is further sorted “to an order where the customer records having the same first discretized attribute scores are further sorted based on the assigned second discretized attribute scores associated with the second scores associated with the second attribute.”
11. The fourth claim step is condition-precedent on the existence of “customer records having the same first discretized attribute scores.”
12. In the example of Table 1 of the Specification, where CV is the first attribute and FV is the second attribute, the fourth claim step would sort the records according to FS, if more than one record has the same CS.
13. According to the fifth step of the method of claim 1, the result of the fourth sorting is further sorted based on the first and second attributes until records having different first and second attribute values have been sorted into different ranks.



14. In the example of Table 1 of the Specification, where CV is the first attribute and FV is the second attribute, the fifth claim step would sort the records according to CV and FV and into different ranks.
15. According to the sixth step of the method of claim 1, the different ranks are assigned evaluation scores. *See* Specification: Table 1.
16. According to the seventh step of the method of claim 1, the records having the highest evaluation scores are identified as the high value customers.

*The scope and content of the prior art*

17. Hughes (para. 30) relates to a method for analyzing records in a computerized customer database.
18. Hughes (para. 2) describes applying a RFM [Recency, Frequency, Monetary] analysis to customer records in computer databases.
19. Hughes (para. 4) explains the RFM analysis process, when applied for the purpose of direct marketing, this way:

This can easily be illustrated by anyone with a customer database that includes purchase history. The database has to keep one piece of information in every customer record: the most recent discretionary purchase data. The database is sorted by that date, and the top 20% (in terms of recency) is given a code of “5”, The next 20% in terms of recent purchases is coded as “4”, etc. Everyone in the database now is either 5, 4, 3, 2, 1 in terms of recency.

20. In describing the RFM analysis process, Hughes (para. 4) describes sorting records by an attribute (Recency) and assigning attribute scores to the sorted records corresponding to a resultant ranking.
21. Hughes describes a similar sorting/assigning of records by Frequency (para. 6) or Monetary (para. 8).
22. Hughes (para. 10) describes combining assigned Recency, Frequency, and Monetary scores based on their individual sorting such that each database record is given “a three digit RFM “cell code” . . . all customers end up with three digits in their database records.”
23. Hughes (para. 35) describes an example of a RFM sorting whereby five groups of records are first sorted by Recency, then each Recency-sorted group is further sorted by Frequency resulting in 25 Frequency groups, which are then further sorted by Monetary to create 125 RFM cells.
24. Jones, III is directed to target marketing of consumers through information provided via a computer database.
25. Jones, III (col. 12, ll. 35-66, discloses calculating the best value to the customer, the “net present value” [NPV], and a customer valuation score, “customer value scoring” derived from information in a database about individual customers and their propensity to accept an offer (col. 11, ll. 37-45).

*Any differences between the claimed subject matter and the prior art*

26. The difference between the claimed subject matter and the prior art is that the prior art does not disclose the claim step “fifth sorting the ordered plurality of customer records resulting from the fourth sorting in to an order based on the attribute values associated with at least the first attribute and the second attribute, until customer records, which have different attribute values associated with at least the first attribute or the second attribute, have been sorted to different ranks” (claim 1).

27. Databases are old in the art.

28. Storing records and sorting stored records are known functions of databases.

*The level of skill in the art*

29. Neither the Examiner nor the Appellant has addressed the level of ordinary skill in the pertinent art of using a computer database to evaluate records. We will therefore consider the cited prior art as representative of the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he absence of specific findings on the level of skill in the art does not give rise to reversible error ‘where the prior art itself reflects an appropriate level and a need for testimony is not shown’”) (*quoting Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

*Secondary considerations*

30. There is no evidence on record of secondary considerations of non-obviousness for our consideration.

PRINCIPLES OF LAW

*§ 101 - Patentable Subject Matter - Process*

[T]he proper inquiry under § 101 is not whether the process claim recites sufficient “physical steps,” but rather whether the claim meets the machine-or-transformation test. [fn]25 As a result, even a claim that recites “physical steps” but neither recites a particular machine or apparatus, nor transforms any article into a different state or thing, is not drawn to patent-eligible subject matter. Conversely, a claim that purportedly lacks any “physical steps” but is still tied to a machine or achieves an eligible transformation passes muster under § 101.

*In re Bilski*, 545 F.3d 943, 961 (Fed. Cir. 2008) (en banc).

*Obviousness*

Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’

*KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 550 U.S. at 407 (“While the

sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”) The Court in *Graham* further noted that evidence of secondary considerations “might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” *Graham*, 383 U.S. at 17-18.

### ANALYSIS

*The rejection of claims 1-7, 10, and 14-16 under 35 U.S.C. §101 as being directed to non-statutory subject matter.*

The Examiner rejected the claims as being directed to nonstatutory subject matter under §101 because the claimed process is not tied to a particular apparatus, notwithstanding that the claims recite the phrase “computer-implemented”, which the Examiner viewed as a nominal recitation, and does not transform underlying subject matter. Answer 3. The Examiner’s reasoning follows the *Bilski* machine-or-transformation test (*see supra*) for determining patent-eligibility of processes under 35 U.S.C. §101.

The Appellant argues that the claimed process is tied to particular machine, that is, a computer with a database for sorting database records, and transforms underlying subject matter, “i.e., records stored in a computer database” (Reply Br. 4).

As to the transformation prong the Examiner’s position that the claimed process fails to transform underlying subject matter is well reasoned. We are not persuaded by the Appellant’s argument as to

error in the Examiner's reasoning (Reply Br. 4). The Appellant argues that the various claim steps of sorting the database records necessarily transforms the records stored in the computer database. A careful reading of the claims reveals no express step of using the computer database to sort the records. The claims reasonably broadly cover sorting the records separate from the database that stores them. Also, we fail to understand in what way the act of sorting "transforms" the underlying records. As best we can understand, the sorting causes the records to change location, but the records themselves do not change.

As to the machine prong, the Examiner's position that the phrase "computer-implemented" is a nominal recitation of structure which would not tie the claimed process to a particular apparatus is also reasonable.

However, as to claims 1-7 and 14-16, the Examiner does not explain why the additional recitation of a "computer database" in the claims for storing "customer record[s] having at least a first attribute and a second attribute" is insufficient to meet the machine prong of the (*Bilski*) machine-or-transformation test. As a result, the Examiner has not made out in the first instance a prima facie case that the claimed subject matter is not a statutory process under §101 for failing to satisfy the machine prong of the (*Bilski*) machine-or-transformation test.

We reach the opposite conclusion as to claim 10. Like claims 1-7 and 14-16, claim 10 recites "computer-implemented". This is a

nominal recitation of structure which would not tie the claimed process to a particular apparatus. But unlike claims 1-7 and 14-16, claim 10 recites no “computer database” and no such database capable of any particular function. All that is recited is a step of “storing the records in a database.” A “database” per se is not necessarily a “computer database.” According to the Webster’s New World Dictionary of Computer Terms 142 (8th Ed. 2000.)(Entry for “database.”), a “database” is defined as

A collection of related information about a subject organized in a useful manner that provides a base or foundation for procedures, such as retrieving information, drawing conclusions, making decisions. *Any collection of information that serves these purposes qualifies as a database, even if the information isn’t stored on a computer.* In fact, important predecessors of today’s sophisticated business database systems were files kept on index cards and stored in file cabinets. Information usually is divided into data records, each with one or more data fields.

Emphasis added. Thus, the recitation of using a “database” per se in the claimed computer-implemented method does not necessarily tie the claimed process to a particular machine. Accordingly, we are not persuaded by the Appellant’s argument that claim 10 necessarily passes the machine prong of the (*Bilski*) machine-or-transformation test and is thereby necessarily a statutory process under §101.

*The rejection of claims 1-7, 10, and 14-16 under 35 U.S.C. §103(a) as being unpatentable over Hughes and Jones III.*

The Examiner states that Hughes discloses the fifth step of the process of claim 1. According to the Examiner,

[t]o summarize, after the customer records have been sorted and assigned attribute scores, the customers are segmented according to their corresponding RFM codes. Hughes teaches the additional step of sorting customer records according to recency, where records are divided into quintiles and assigned attribute values of 1-5. Thus, the Examiner asserts that the placement of customers into their respective three digit RFM cell codes, which is based on the attribute values associated with both the first and second attributes and a third attribute, meets the claimed limitation of “fifth sorting the ordered plurality of customer records resulting from the fourth sorting in to an order based on the attribute values associated with at least the first attribute and the second attribute, until customer records, which have different attribute values associated with at least the first attribute or the second attribute, have been sorted to different ranks.”

Answer 25-26.

The Appellant disagrees. *See* App. Br. 14 and Reply Br. 5.

We agree with the Appellant.

Hughes sorts the records independently by Recency, Frequency, and Monetary. The passage at para.10 of Hughes (FF 22) that the Examiner is relying upon describes attaching to each record a number based on each of the Recency, Frequency, and Monetary sortings. This yields a three-digit code to be assigned to each cell. The fifth step of the claimed method is doing something different. By that step, the result of the fourth sorting is further sorted based on the first and second attributes until records having different first and second attribute values have been sorted into different ranks. FF 13. The fourth step involved sorting the third sorting further sorted “to an order where the customer records having the same first discretized attribute scores are further sorted based on the assigned second



discretized attribute scores associated with the second scores associated with the second attribute.” FF 10. Looking at Table 1 of the Specification, in effect, the fifth step of the method of claim 1 would sort the records according to attributes CV and FV into different ranks after they had been sorted by the attributes CV (first step) and FV (step 2) and assigned respective first and a second discretized attribute scores CS and FS (first and second steps), sorted by CS (third step), and by FS if more than one record has the same CS. FF. 7-9, 12, and 14. While there appears to be no dispute that Hughes discloses assigning attribute scores to the sorted records (*see* FF 19), nothing in Hughes speaks to sorting the records by those scores. Accordingly, Hughes does not disclose those claim steps where such a sorting is to be performed and that would include the fifth sorting step.

Because the evidence does not support the Examiner’s basis for rejecting the claims over the cited prior art combination, we find that a *prima facie* case of obviousness has not been made out in the first instance. While our discussion above is focused on claim 1, the other independent process claim 10 also provides for steps by which the records are sorted by assigned discretized attribute scores. Since the Examiner’s position that Hughes discloses such a sorting is not supported by the evidence, the rejection as to that claim is also not sustained. The rejection of the dependent claims is not sustained for the same reasons. *Cf. In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir.

1992) ("[D]ependent claims are nonobvious if the independent claims from which they depend are nonobvious.").

*The rejection of claims 11-13 under 35 U.S.C. §103(a) as being unpatentable over Hughes, Jones III, and RFM.*

Independent claims 11, 12, and 13 provide for a computer architecture, system, and an article, respectively, comprising means and instructions paralleling the steps of the process claims. The Examiner takes the same position as to the means and instructions corresponding to the steps of the claimed processes by which the records are sorted by assigned discretized attribute scores that was taken when addressing that limitation in claim 1. *See* Answer 19, 20, and 22. Since, for the foregoing reason, the evidence does not support the finding that Hughes discloses such a sorting, the rejection as to these claims is also not sustained.

### CONCLUSIONS

We conclude that the Appellant has shown that the Examiner erred in rejecting claims 1-7 and 14-16 under 35 U.S.C. §101 as being directed to non-statutory subject matter.

We conclude that the Appellant has not shown that the Examiner erred in rejecting claim 10 under 35 U.S.C. §101 as being directed to non-statutory subject matter.

The rejection of claims 1-7, 10, and 14-16 under 35 U.S.C. §103(a) as being unpatentable over Hughes and Jones III and the

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rejection of claims 11-13 under 35 U.S.C. §103(a) as being unpatentable over Hughes, Jones III, and RFM are not sustained.

#### DECISION

The decision of the Examiner to reject claims 1-7 and 10-16 is affirmed-in-part

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2007).

#### AFFIRMED-IN-PART

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